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Operating Systems

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HW4

1. Two ways the operating system could know which program to run would be the file's extension (like .pdf, .txt, .mp3) or by looking at the file's contents and making its decision based on what is actually in the file.
2. Yes, a hierarchical file system could be achieved with only a single directory by using a file naming convention that includes folders and directories in the name of the files. Therefore, there aren't actually file system directories but the files could be organized and identified as being a part of folders by how they are named.
3. I think a linked list could be appropriate in this situation because of how largely the file is growing and shrinking in its variance. If the file grows to be very large like 4 MB, the linked list could just keep jumping to new unused blocks without having to worry about contiguous spaces being available or continuously modifying a table of inodes and data blocks. Then if the file shrinks again, the links pointing forward to the part of the file that has shrunk can just be cut off and those blocks can open up again, and schemes like the table would not have to modify everything again.
4. In this scenario, ¾ of the disk space would be wasted because all of the 1 KB files would use a 4 KB block, leaving the remaining 3 KB unused. I think wastage for a real file system would be lower than this number, because many file systems today have adjusted

their block sizes to be most compatible with the average or median file size, making the block sizes as efficient as they can be.